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10/578,928	05/09/2006	Toshiyuki Inagaki	120682	5143

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EXAMINER
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KALAFUT, STEPHEN J

ART UNIT	PAPER NUMBER
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1795

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/578,928	<b>Applicant(s)</b> INAGAKI, TOSHIYUKI	
	<b>Examiner</b> Stephen J. Kalafut	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09 May 2006, 20 June 2006</u> .                               | 6) <input type="checkbox"/> Other: ____.                          |

Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no antecedent for “the deformation preventing member” in claim 17, or its alternative parent claims 1 and 2. Should claim 17 depend from claim 16?

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Richards (US 5,547,777), cited by applicant.

Richards discloses a fuel cell stack that includes a plurality of multicell modules (figure 8) stacked in series (figure 11), each of the modules including a plurality of cells (10) layered in the stacking direction, and including opposite end cells within each module. Anchoring bolts (23b), inserts (23a) and housing portions (20) cooperate to form restraining members that connect to plates (22) at opposite ends of each module, and thus restrain of the modules at the opposite end fuel cells thereof. The close cooperation of the bolts, inserts and housing portions would also restrain the modules in a direction perpendicular to the stacking direction. Each end plate is also connected to an end plate of an adjacent module via mounting hardware (34) in the form of threaded nuts and bolts. These would form connecting members, and like restraining members, are disposed within holes of the end plates that extend outwardly of the cells

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therebetween. Thus, the opposite end cells each include an extended portion, where the modules are restrained by the restraining member. The bolts (23a) would constitute shafts that would both restrain and tighten the module of fuel cells, and thus the stack thereof. The anchoring bolts and threaded bolts are similar, but still different in size and specific shape. Thus, the connecting member is different from the restraining member.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Myerhoff (US 4,431,714), cited by applicant.

Myerhoff discloses a fuel cell stack comprising a plurality of multicell modules (1) stacked in series, which in turn comprise a plurality of fuel cells (3, 5, 7, 9 and 11), including end fuel cells (3, 11), and a restraining member (27) that restrains the cells in each module at the opposite end cells thereof. See figure 3.

Claims 1, 2 and 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by either Ashizawa *et al.* (JP 62-31,942) or Komatsu *et al.* (JP 62-165,874), both cited by applicant.

Ashizawa *et al.* disclose a fuel cell stack comprising a plurality of multicell modules (6a through 6d), stacked in series (figures 1 and 2). At the ends of each module are frames (11a) that form outward extensions of the end fuel cells. The two frames of each module are connected to each other via threaded bolts (8), which would form restraining members, which extend through holes in the outwardly extending part of each frame. The frames and bolts would also cooperate to restrain the modules in the direction perpendicular to the stacking direction. The bolts would

each constitute a restraining shaft as well as a stack tightening shaft, due to their threads cooperating with nuts. Also see figures 3, 4 and 7.

Komatsu *et al.* disclose a fuel cell stack comprising a plurality of multicell modules (6) stacked in series (figures 2 and 3). At the ends of each module are plates (2) that form outward extensions of the end fuel cells. The two plates are connected to each other via threaded bolts (3), which would form restraining members, which extend through holes in the outwardly extending part of each frame. The frames and bolts would also cooperate to restrain the modules in the direction perpendicular to the stacking direction. The bolts would each constitute a restraining shaft as well as a stack tightening shaft, due to their threads cooperating with nuts (5).

Claims 1, 2 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Murata *et al.* (JP 58-115,772), cited by applicant.

Murata *et al.* disclose a fuel cell stack comprising a plurality of multicell modules (1) stacked in series (figure 8). At the ends of each module are plates (42a, 42b) that form outward extensions of the end fuel cells. The two plates are connected to each other at their outer edges via bolts (46), which would form restraining members. These restraining members would restrain the modules in both the stacking and perpendicular directions.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto (JP 61-39,373).

Yamamoto discloses a fuel cell stack comprising a plurality of multicell modules (30) stacked in series (figure 1). At the ends of each module are plates (2, 3), which are connected to

each other at their outer edges via bolts (8) and manifolds (4 through 7) ), which would form restraining members. These restraining members would restrain the modules in both the stacking and perpendicular directions, due to the bolts being disposed inwardly into the plates.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over any one of Richards, Myerhoff, Ashizawa *et al*, Komatsu *et al*. and Murata *et al.*, each in view of Gionfriddo (US 4,689,280).

This claim differs from Richards, Myerhoff, Ashizawa *et al*, Komatsu *et al*. and Murata *et al*. by reciting a dummy cell at the end of each fuel cell module. Gionfriddo discloses a plate structure (50) used for the end plates of a fuel cell stack (column 3, lines 7-11), which includes a dummy cell (column 3, lines 62-68). Because this helps the fuel cell to accommodate shrinkage (column 3, lines 7-11) and provides resiliency (column 3, lines 65-68), it would be obvious to use dummy cells as shown by Gionfriddo as the end cells of the fuel cell modules of either Richards, Myerhoff, Ashizawa *et al*, Komatsu *et al*. or Murata *et al*.

Claims 9, 11, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards in view of Barton *et al*. (US 5,686,200), cited by applicant.

These claims differ from Richards by reciting that the restraining member is a clip or an ear portion formed in the extended portion of the end cell, or by reciting deformation preventing members disposed between the extended portions of the opposite end cells, which may be plastic or elastic. Barton *et al.* disclose fuel cell stack with ends plates (42, 52) disposed around a set of cells, and extending beyond the edges thereof, which are held together with clips (64) or ear portions (152a, 152b, 242a, 252b), and which may also include deformation preventing members (242b, 252a) extending between outwardly extending parts of the end plates. These members are “compliant” (column 11, lines 26-30), and would thus be resilient. Because these compliant members provide nearly constant compressive forces as the MEA changes thickness over time (column 3, lines 20-24), it would be obvious to use the clip, ear portion and deformation preventing members of Barton *et al.* in the multi-module fuel cell stack of Richards.

Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards in view of Sugita *et al.* (US 6,613,470), cited by applicant.

These claims differ from Richards by reciting that the extended portion of the end fuel cell and the restraining shaft are insulated from each other by an electric insulator, which may be a bushing fixed to the hole in the extended portion or a cylinder supported by the shaft. The bushing may also have a flange. Sugita *et al.* disclose fuel cell fasteners that include a cylindrical insulator (98) that surrounds a shaft (86), and also serves as a bushing within a hole (96) in an end plate (16). The cylindrical insulator adjoins a plate-shaped insulator (84), which would form a flange. Because of the safety afforded by the electrical insulators, it would be obvious to use the cylindrical and plate-shaped insulators of Sugita *et al.* with the end plate and

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threaded bolt of Richards. The head of the bolt would mate with a plate-shaped insulator, thus further showing the usefulness of a flange.

The disclosure is objected to because of the following informalities: In figure 15, there are two different parts numbered 33. Should one of these be instead numbered 32? Appropriate correction is required.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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/Stephen J. Kalafut/  
Primary Examiner, Art Unit 1795